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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-065299

(43)Date of publication of application : 08.03.1996

(51)Int.Cl.

H04L 12/18

G06F 13/00

H04L 12/40

(21)Application number : 06-201868

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NEC CORP

(22)Date of filing : 26.08.1994

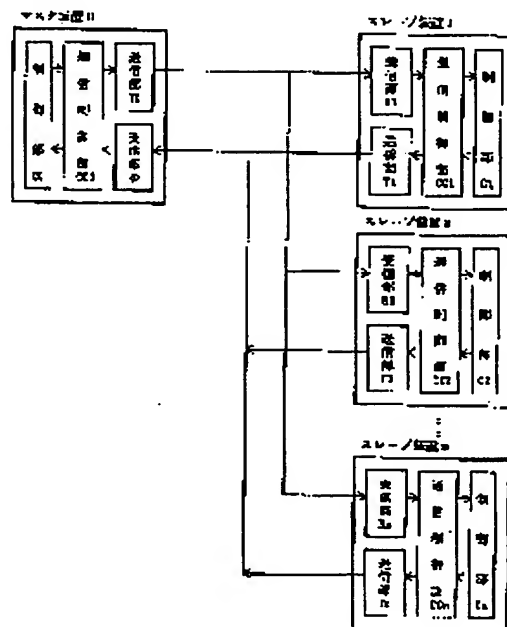
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(54) CONTROLLING METHOD FOR TRANSMISSION RIGHT**(57)Abstract:**

PURPOSE: To prevent normal transmission from being disabled due to mutual interference of data on a shared communication line caused by simultaneous transmission of data from plural slave devices to one master device.

CONSTITUTION: In an idle state, a signal for permitting only the transmission of a transmission right request signal to all the slave devices 1, 2...n is cyclically broadcasted and transmitted from a master device 0 to all the slave devices. When transmitting data, first of all, any slave device transmits the transmission right request signal to the master device 0 and the master device 0 broadcasts and transmits the transmission right permitting signal for applying the transmission right to that slave device to all the slave devices. When the slave devices transmitting the transmission right request signal receives that transmission right permitting signal, it is recognized that the transmission right is applied to that device itself, the transmission of data is started, and the other slave devices recognize that the transmission right is applied to any other device, and inhibit the transmission of all the data.

**LEGAL STATUS**

[Date of request for examination] 26.08.1994

[Date of sending the examiner's decision of] 18.02.1997

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CLAIMS

[Claim(s)]

[Claim 1] Two or more communication devices share the same communication line, and one of said communication devices operates as a master unit which performs transmission-right control, and the remaining plurality operates as a slave unit. Get down, carry out multiple address transmission of the signal, and said master unit sets to the data transmission system to said two or more slave units with which said two or more slave units transmit the going-up signal to said master unit at random. When an uphill circuit is idle status, said master unit When multiple address transmission of the signal with which transmission of only a bid signal is permitted to said two or more slave units is carried out and a bid signal is received from either of said two or more slave units It tells that the transmission right was granted to the slave unit which carried out multiple address transmission of the signal which grants the transmission right of all signals at said two or more slave units, and transmitted the bid signal until the slave unit released the transmission right. The transmission-right control approach characterized by telling that transmission of all the signals with which a transmission right includes a bid signal over other slave units was forbidden to other slave units.

[Claim 2] Said master unit is the transmission-right control approach according to claim 1 characterized by carrying out multiple address transmission of the signal with which transmission of only said bid signal is permitted periodically.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] About a data transmission system, especially, this invention shares the same communication line between two or more communication devices, and relates to the transmission-right control approach in case two or more communication devices transmit a signal at random.

[0002]

[Description of the Prior Art] Conventionally, in this kind of data transmission system, when a signal is transmitted, in order to prevent the collision with the sending signal of other equipments on a communication line, the transmission right was granted only to one equipment, other equipments are forbidden from transmitting, and there are the following well-known examples as a management method of a transmission right.

[0003] As the 1st well-known example, the transmission-right control signal between the subscriber stations which require and release a transmission right is transmitted [the control station which uses the circuit of dedication with another data communication for the communication link of the signal (it is hereafter called a transmission-right control signal) about the demand of a transmission right, release, and modification, and controls a transmission right] and received by the communication link of 1 to 1 to "JP,3-283829,A."

[0004] The transmission right is granted to sequence contrary to the sequence transmitted to the "JP,3-136426,A official report" as the 2nd well-known example when a transmission right was required by the carrier signal and two or more equipments transmitted a bid signal to coincidence.

[0005] As the 3rd well-known example, even when the Request to Send has occurred from neither of the equipments, the equipment which some grants the transmission right to one equipment and needs a transmission right carries out multiple address transmission of the bid signal to all equipments, and in a "JP,60-254943,A official report", equipment with a transmission right receives it, and carries out multiple address transmission of the transfer of a transmission right at it. And when a transmission right moves, the equipment without a transmission right has suspended transmission of a fixed time amount and bid signal.

[0006]

[Problem(s) to be Solved by the Invention] Since in the case of the 1st well-known example the circuit of dedication is needed upwards for a transmission-right control signal and between a control station and subscriber offices is performed by the communication link of 1 to 1, a control station will not escape that the traffic of the load of a control station and the circuit for transmission-right control signals increases, if the signal for several subscriber office minutes must be transmitted and received to 1 time of a bid and subscriber offices increase in number.

[0007] Moreover, in the case of the 2nd well-known example, there is a problem that the equipment which required the transmission right first can finally grant a transmission right.

[0008] Moreover, in the case of the 3rd well-known example, regardless of whether there is any transmitted paddle, a transmission right is granted, it does not know whether transmission is actually performed, but a bid signal is transmitted from other equipments and a collision may occur also in transmission with equipment without a transmission right. Moreover, although transmission of a fixed time amount and bid signal is forbidden when a transmission right includes other equipments Even if it carries out fixed time amount progress, since a collision occurs when it is under transmission, a circuit is vacant until the fixed time amount passes, when transmission is completed before fixed time amount

progress, and it becomes useless and the transmission right is demanded by the multiple address, there is still a problem that the traffic of a circuit is large.

[0009]

[Means for Solving the Problem] In order to solve the trouble mentioned above, the transmission-right control approach by this invention When an uphill circuit is idle status, the master unit which controls a transmission right When multiple address transmission of the signal with which transmission of only a bid signal is permitted to all slave units is carried out and a bid signal is received from any one slave unit It tells that the transmission right was granted to the slave unit which carried out multiple address transmission of the signal which grants the transmission right of all signals at all slave units, and transmitted the bid signal until the slave unit released the transmission right. By telling that transmission of all the signals with which a transmission right includes a bid signal over other slave units was forbidden to other slave units, two or more slave units go up to coincidence, a signal is transmitted, and it prevents that a collision occurs.

[0010]

[Example] Next, this invention is explained with reference to a drawing. In this example, the signal of "going down" and the direction of a slave unit to a master unit is called "going up" for the signal of the direction of a slave unit from a master unit.

[0011] Drawing 1 is the block diagram of the communication device of the data transmission system in one example of this invention. Reference of drawing 1 constitutes a master unit 0 from the transmitting section T0 which transmits data, a receive section R0 which receives data, and the communications control section CC 0 which controls the transmitting section T0 and a receive section R0 and the control section C0 which performs high order layer processing of the communications control section CC 0. Slave units 1 and 2 -- All n is the same configurations and the component is the same as that of a master unit 0. The transmitting section T0 of a master unit 0 is slave units 1 and 2. -- Parallel connection of the receive section R0 is carried out to the receive section R1 of n, and 2 --n with the transmitting section T1 and 2 --n again.

[0012] Drawing 2 is the example of a state transition of a master unit 0. In drawing 2, transmission-right idle status is in the condition of having granted the transmission right to no slave unit, and only a bid signal is received from all slave units. A condition is in the condition of having granted the transmission right to one slave unit, during transmission-right authorization.

[0013] Drawing 3 is slave units 1 and 2. -- It is the example of a state transition of n. In drawing 3, transmission-right idle status is in the condition that the transmission right is granted to no slave unit, and only a bid signal is ready-for-sending ability from a slave unit. The transmission right is granted to the self-slave unit and transmission-right busy status is in the condition which can transmit all signals. Equipment busy status besides a transmission right is in the condition that the transmission right is granted to other slave units, and a self-slave unit is in the condition that transmission of all signals is forbidden.

[0014] Drawing 4 is introductory notes of an SDL Fig. shown in drawing 9 from drawing 5. Drawing 5 is an SDL Fig. showing the actuation in the transmission-right idle status of the transmission-control section CC 0 of a master unit 0. Drawing 6 is an SDL Fig. which expresses the actuation in a condition during transmission-right authorization of the transmission-control section CC 0 of a master unit 0. Drawing 7 is slave units 1 and 2. -- It is the transmission-control section 1 and CC 2 of n. -- It is an SDL Fig. showing the actuation in the transmission-right idle status of n. Drawing 8 is slave units 1 and 2. -- It is the transmission-control section 1 and CC 2 of n. -- It is an SDL Fig. showing the actuation in equipment busy status besides the transmission right of n. Drawing 9 is slave units 1 and 2. -- It is the transmission-control section 1 and CC 2 of n. -- It is an SDL Fig. showing the actuation in the transmission-right busy status of n. Drawing 10 is a master unit 0 and slave units 1 and 2. -- It is the sequence diagram showing an example of the sequence of the data transmission between n.

[0015] Next, transmission-right control is explained with reference to drawing 1, drawing 5, drawing 6, drawing 7, drawing 8, drawing 9, and drawing 10. Master units 0 are all the slave units 1 and 2 about a transmission-right authorization (all equipments) signal by initialization processing, when equipment starts. -- Multiple address transmission is carried out at n, Timer T is started and a condition is made into a "transmission-right opening" (it is processing and S1001 like S512 ->S513 ->S514). Slave units 1 and 2 which received the transmission-right authorization (all equipments) signal -- n makes a condition a "transmission-right opening" (S701 ->S702, S801 ->S802, and S921 ->S922). Master units 0 are all the slave units 1 and 2 about a transmission-right authorization (all equipments) signal, when

Timer T carries out a time-out. -- Multiple address transmission is carried out at n, Timer T is rebooted and a condition is made into a "transmission-right opening" (S511 ->S512 ->S513 ->S514, S1002).

[0016] The communications control section CC 1 to a master unit 0 which performed the Request to Send in the communications control section CC 1, and received it when the need for data transmission occurred transmits a bid (equipment 1) signal to a master unit 0, and the control section C1 of a slave unit 1 starts Timer Ta (S721 ->S722 ->S723 ->S724, S1003). When not receiving the transmission-right enabling signal which is a reply signal over a bid signal in the time amount of this time Ta, Timer Ta carries out a time-out, collides with the bid signal which other slave units transmitted, judges that it was normally unreceivable with the master unit 0, and starts resending processing (S741). The slave unit 1 which was in charge of resending starts a resend timer Tr (S742), resends a bid (equipment 1) signal by the time-out of the resend timer Tr, and reboots Timer Tr (S751 ->S752 ->S753 ->S754).

[0017] Master units 0 are all the slave units 1 and 2, when normal reception of the bid (equipment 1) signal is carried out. -- Multiple address transmission of the transmission-right authorization (equipment 1) signal is carried out at n, by suspending Timer T, periodic transmission of a transmission-right authorization (all equipments) signal is stopped, and a condition is carried out "during transmission-right authorization" (S501 ->S502 ->S503 ->S504, S1004). Since the device number is self-equipment, if Timer Ta and a resend timer Tr become during starting, it will be made to stop, and the slave unit 1 which received the transmission-right authorization (equipment 1) signal notifies that the transmission right was acquirable to the control section C1, carries out a condition "during transmission-right use", and enables transmission of data (S731 ->S732 ->S733 ->S734 ->S735). Slave unit 2 which received the transmission-right authorization (equipment 1) signal -- Since the device numbers are other equipments, n carries out a condition "during equipment use besides a transmission right", and carries out transmission of a bid signal to prohibition (S711 ->S712).

[0018] If a transmission right is acquirable, in order that the control section C1 of a slave unit 1 may transmit data, data transmission in the communications control section CC 1 is required, and the communications control section CC 1 which received it transmits data (S901 ->S902 ->S903, S1005). The master units 0 which received data are signals other than a bid signal and a transmission-right release signal, and processing corresponding to the signal is performed (S601 ->S602 ->S603). If transmission of data completes the control section C1 of a slave unit 1, a transmission-right release request is performed in the communications control section CC 1, and the communications control section CC 1 which received it will transmit a transmission-right release (equipment 1) signal, and will make a condition a "transmission-right opening" (S911 ->S912 ->S913, S1006). The master units 0 which received the transmission-right release request (equipment 1) signal are all the slave units 1 and 2 about a transmission-right authorization (all equipments) signal. -- Multiple address transmission is carried out at n, Timer T is started and a condition is made into a "transmission-right opening" (S611 ->S612 ->S613 ->S614, S1007). Slave unit 2 which received the transmission-right authorization (all equipments) signal -- n makes a condition a "transmission-right opening." (S801 ->S802) .

[0019]

[Effect of the Invention] As explained above, according to this invention, transmission of a master unit requires only 1 time per signal irrespective of the number of slave units. A slave unit When it ends when transmitting the signal only to one master unit, and a transmission right becomes unnecessary, are released immediately, and other slave units are usable. Since the slave unit of others [slave unit / one / under / data transmission] does not transmit a signal and a collision is not generated, the load of equipment required for transmission-right control and the traffic of a circuit can be stopped low.

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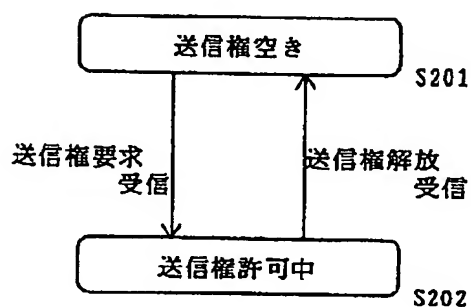
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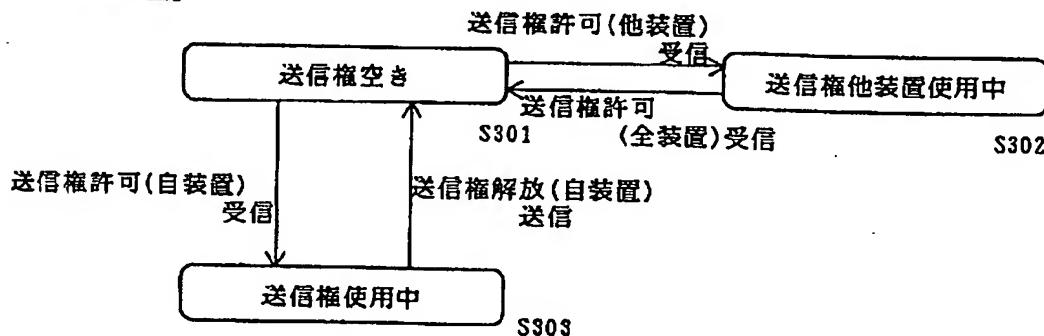
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DRAWINGS

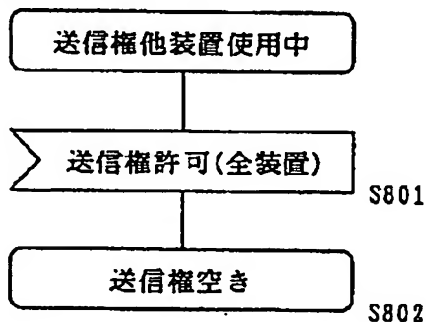
[Drawing 2]
[マスタ装置]



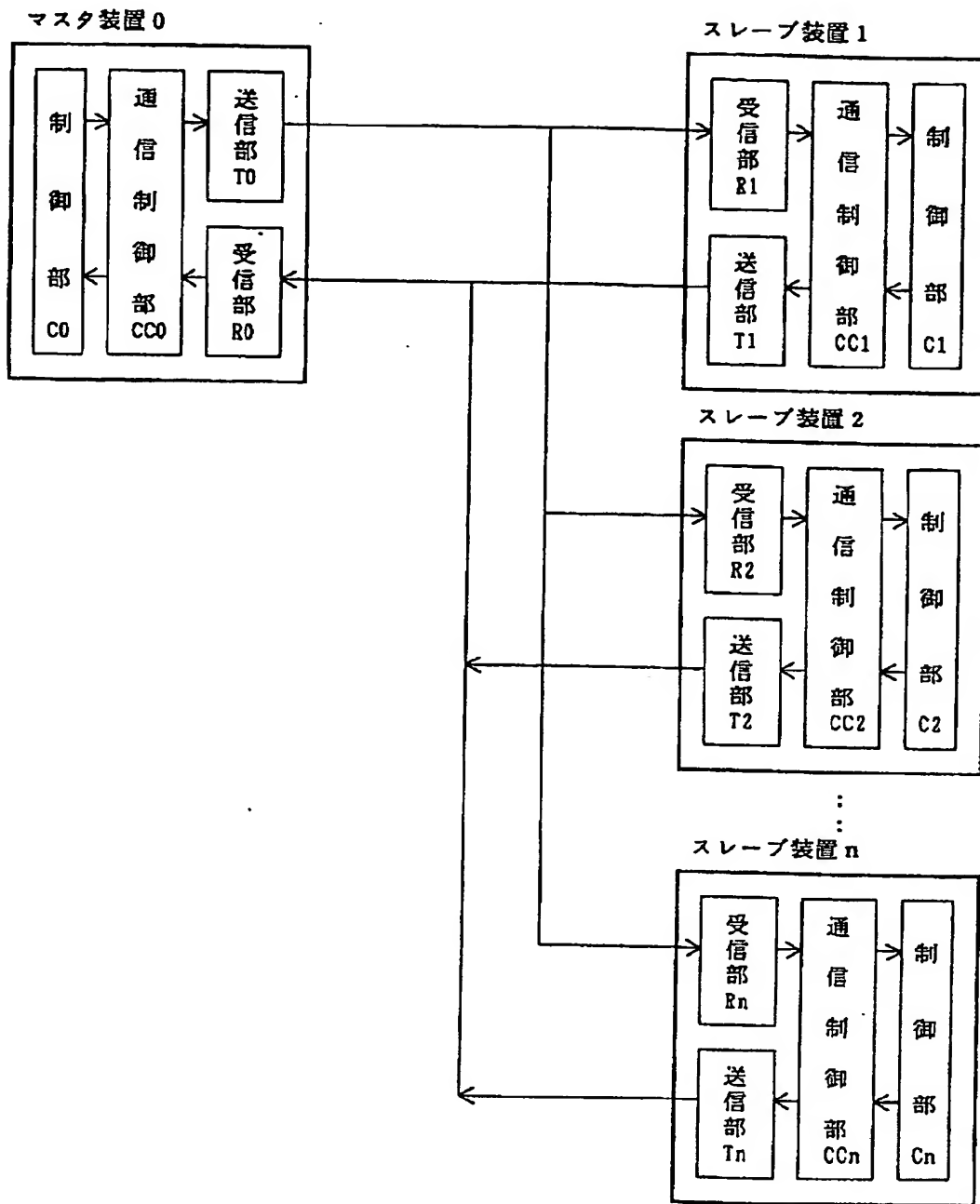
[Drawing 3]
[スレーブ装置]



[Drawing 8]
[スレーブ装置]



[Drawing 1]



[Drawing 4]

[マスタ装置, スレーブ装置共通]

状 態 名	S401	状態
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処理内容	S402	処理
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処理内容	S403	処理群
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[マスタ装置]

信 号 名	S404	スレーブ装置からの信号受信
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信 号 名	S405	スレーブ装置への信号送信
-------	------	--------------

イベント名	S406	装置内部のイベント受信
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[スレーブ装置]

信 号 名	S407	マスタ装置からの信号受信
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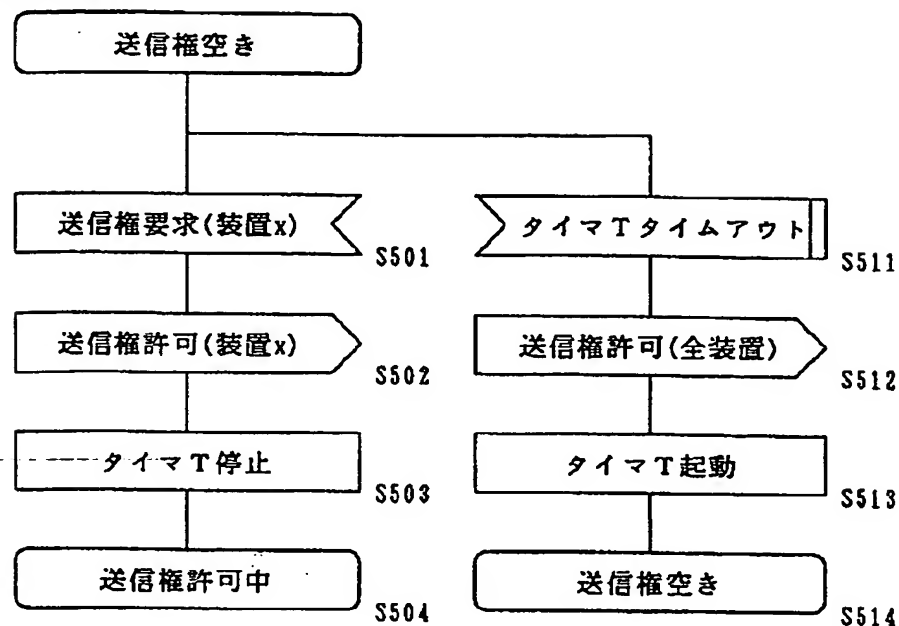
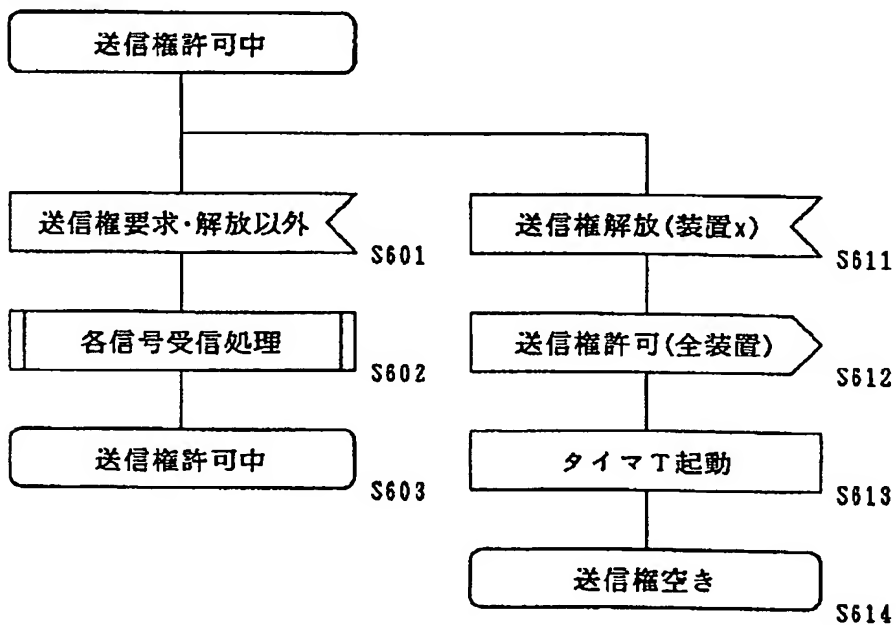
信 号 名	S408	マスタ装置への信号送信
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イベント名	S409	装置内部のイベント受信
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イベント名	S410	装置内部のイベント送信
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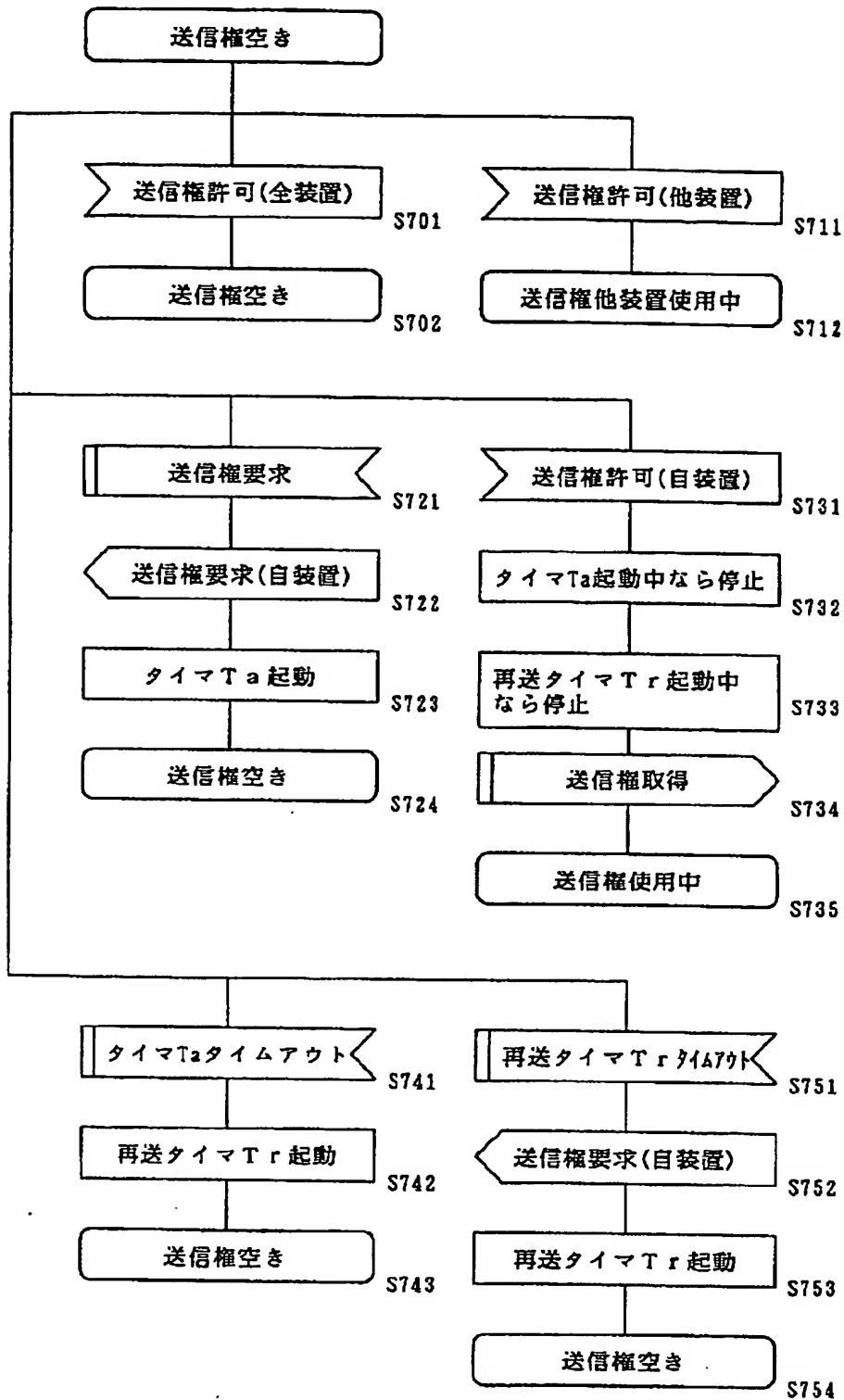
[Drawing 5]

[マスタ装置]

[Drawing 6]
[マスタ装置]

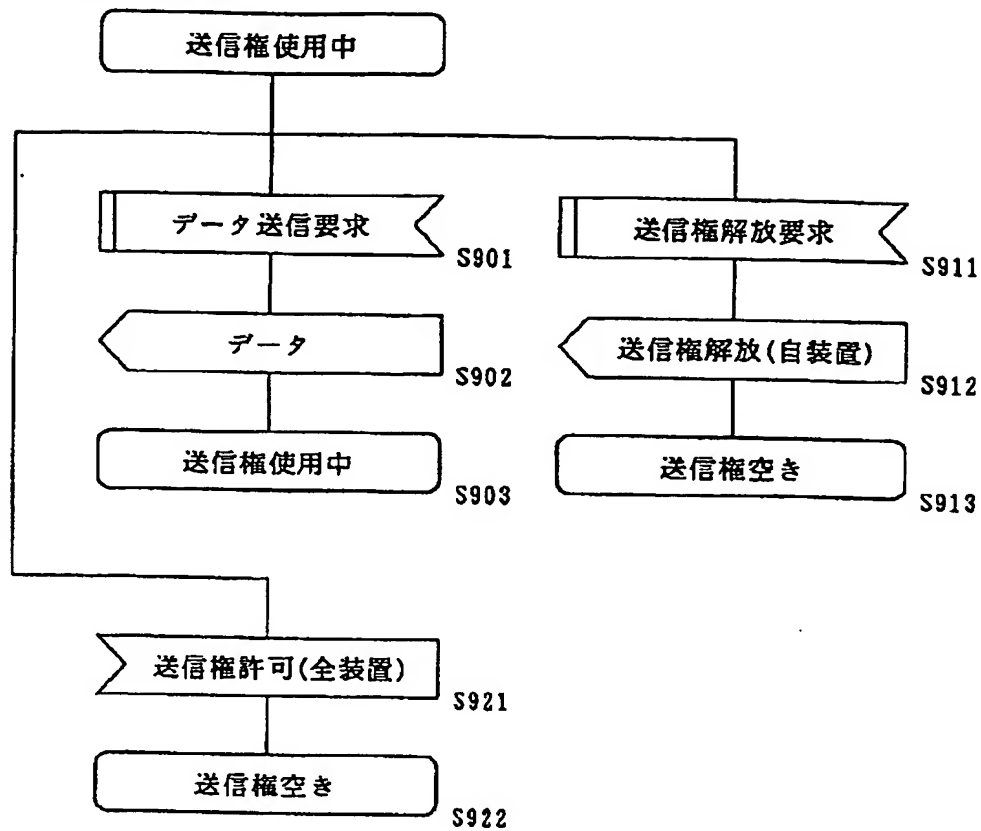
[Drawing 7]

[スレーブ装置]

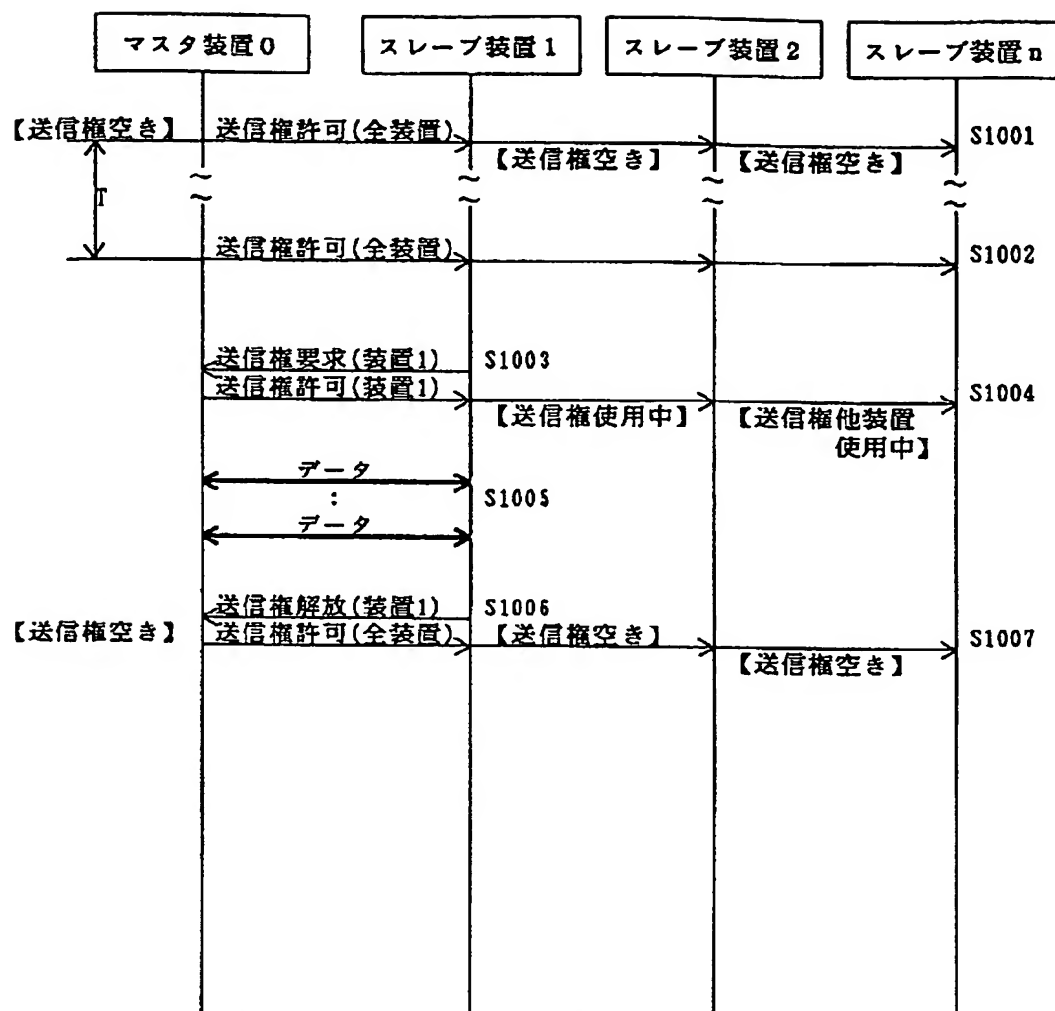


[Drawing 9]

[スレーブ装置]



[Drawing 10]



【】は状態(スレーブ装置 n の状態はスレーブ装置 2 と同じ)

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